UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,269	11/26/2003	Dana Henriksen	26530.91	1261

47699 7590 06/20/2006

HAYNES AND BOONE, LLP
901 MAIN STREET
SUITE 3100
DALLAS, TX 75202-3789

EXAMINER	
LAI, VINCENT	
ART UNIT	**PAPER NUMBER**
2181	

DATE MAILED: 06/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/724,269	HENRIKSEN, DANA	
	Examiner	Art Unit	
	Vincent Lai	2181	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Supervisory

FRITZ FLEMING
PRIMARY EXAMINER
GROUP 2100

6/12/2006

AU 2181

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/17/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 17 February 2004 was considered by the examiner.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Method and System For Management of Global Queues Utilizing a Locked State."

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-28 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-3, 11, and 15-16 all claim definitions, which are non-statutory, since definitions are not concrete and tangible results. All other claims are rejected due to dependence of above claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hagan et al (U.S. Patent # 5,966,547), herein referred to as Hagan in view of Parlante (Linked List Basics).

As per claim 1, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan does not explicitly teach the use of a linked list with head and tail pointers. Hagan does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante does teach a linked list with head pointer (A head pointer is inherent with linked lists) and tail pointer (See section 3, part 4: Tail pointers are common with linked lists and thus is considered a basic of linked lists). The queue would comprise:

> defining a locked state for the queue, wherein a queue head pointer is null and a queue tail pointer does not point to the queue head pointer (This can a normal occurrence with a linked list system, depending on the algorithm used, in which an element is in

the process of being added to an empty queue. This in-between step will now be interpreted as being in locked state);

defining the queue head pointer to function as a next pointer of a last element of the plurality of elements when the queue is empty (See section 4, "CopyList() with Local References" example on page 25); and

defining an add to end function for adding a new element to the queue even when the queue is in the locked state, the add to end function including setting a next pointer of the new element to null; as an atomic transaction, setting the queue tail pointer to point the new element, while saving a location of the last element; and setting the next pointer of the last element to point to an address of the new element by using the last element's saved location (See section 3, part 4: This action is also inherent to queues and the actions are indicative of an enqueue to an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan with Parlante. Hagan already discloses the use of other queues (See column 3, lines 29-32). Parlante teaches the use of a linked list with head and tail pointers. Modifying the queue of Hagan wherein the queue has a head pointer, a tail, and a plurality of elements each having a next pointer would be a stylistic preference and is within the scope of the invention by Hagan.

As per claim 2, Hagan teaches further comprising defining a locking function of the queue, the locking function including: if the previous value of the head pointer is null and the queue is not empty, repeating the locking function (See column 5, lines 55-57).

Hagan is silent on many other aspects of the queue but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches if the queue is not empty and not locked, as an atomic transaction, setting the head pointer to null and retaining a previous value of the head pointer (See section 3, part 3).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 3, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising defining that the queue is unlocked when the head pointer is not null (By the contrapositive of the definition in claim 1, this must be true), or when the head pointer is null and the tail pointer points to

the head pointer (This is the case when the queue is empty and thus inherently would be unlocked).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 4, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising an add to front function for adding the new element to a front position of the queue, the add to front function including: if the queue is empty adding the new element to an end position of the queue (This action is inherent to queues and the actions are indicative of an enqueue to an empty queue); and if the queue is not empty: locking the queue; setting the next pointer of the new element to the previous value of the head pointer; and pointing the head pointer to the new element, thereby unlocking the queue (This action is inherent to queues).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and

tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 5, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising a remove from front function, wherein a front-most element is removed from the queue, the remove from front function including: locking the queue (Inherently done to avoid conflicts in a multi-processor system); if the queue is not empty and an element occupying a front-most position of the queue has a next pointer that is not null, setting the head pointer to the address in the front-most element's next pointer (Inherently done with a dequeue so rest of queue is not lost); and if the queue is not empty and the front-most element's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the front-most element, pointing the tail pointer to the head pointer, thereby implicitly unlocking the queue (Inherently done with a dequeue with en empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 6, Hagan discloses further comprising if the atomic compare and exchange failed, waiting for the next pointer of the front-most element to become non-null, and pointing the head pointer to an element pointed to by the next pointer of the front-most element, thereby implicitly unlocking the queue (See column 5, lines 55-57).

As per claim 7, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising a remove specific function, wherein a target element is removed from the queue, the remove specific function including: locking the queue (Inherently done to avoid conflicts in a multi-processor system); and if the queue is not empty: traversing the queue to locate the target element (Inherent as the only known elements are the first and last elements); and if the target element's next pointer is not null and the target is not addressed by the previous value of the head pointer, setting the next pointer of an element previous to the target to point to an element pointed to by the target's next pointer (Inherently done with a dequeue so rest of queue is not lost), and returning the head pointer to the previous value, thereby implicitly unlocking the queue (Inherently done with a dequeue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 8, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising: if the target element's next pointer is not null and the target is addressed by the previous value of the head pointer, setting the head pointer to point to the element pointed to by the target's next pointer, thereby implicitly unlocking the queue (Inherently done with a dequeue to return from its locked state); and if the target's next pointer is null and the target is not addressed by the previous value of the head pointer, setting the next pointer of the element previous to the target to null (Inherent done with a dequeue in which it element is to be removed).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 9, Hagan discloses further comprising: if the atomic compare and exchange was performed and failed: waiting until the target's next pointer is not null (See column 5, lines 55-57).

Hagan is silent on many other aspects of the queue but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches if the target's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the target setting the tail pointer to point to the element previous to the target (This is inherently done after a dequeue), or to point to the head pointer if the target is addressed by the previous value of the head pointer (This is inherent with an empty queue); if an element addressed by the target's next pointer is an only remaining element in the queue, sending the head pointer to point to the only remaining element, thereby implicitly unlocking the queue (This is inherent with actions after a dequeue at the top of the queue); and if the element addressed by the target's next pointer is not the only remaining element in the queue, setting the next pointer of the element previous to the target to the address in the target's next pointer and setting the head pointer to the previous value of the head pointer, thereby implicitly unlocking the queue (This is inherent to ensure that the head and the tail point to the correct places); and if the atomic compare and exchange was performed and succeeded: if the queue is not empty, setting the head pointer to the previous

value of the head pointer, thereby implicitly unlocking the queue (This is inherent with a normal dequeue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 10, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising an empty function, wherein each of the plurality of elements are removed from the queue, the empty function including: locking the queue; and if the queue is not empty: as an atomic transaction, pointing the tail pointer to the head pointer while retaining a previous value of the head pointer and the tail pointer, thereby implicitly unlocking the queue; and by using the previous values of the head pointer and tail pointer, traversing a plurality of the elements which have been dequeued, and waiting for the next pointer of each element not addressed by the previous value of the tail pointer to become non-null (This sort of action describes the action of a deconstructor, which, if not inherent, is obvious to a person have ordinary skill in the art at the time the invention was made).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 11, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue) in a multiprocessor environment (See column 2, lines 28-30), the method comprising: allowing a first processor to both add and remove elements from the queue (See abstract and column 5, lines 3-6 and 17-19: The abstract says one of the processors only posts entries in the queue and that processor is known as the posting processor. Thus the first processor would be the host processor, which can remove the entries. It later goes on to disclose both processors can post to the queue), allowing a second processor to only add new elements to the queue (See abstract and column 5, lines 3-6: The abstract says one of the processors only posts entries in the queue and that processor is known as the posting processor);

Hagan does not explicitly teach the use of a linked list with head and tail pointers. Hagan does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante does teach a queue which has a head pointer to point to a first element of the queue or to null if the queue is empty (A head pointer is inherent

with linked lists), a tail pointer to point to a last element of the queue or to the head pointer if the queue is empty (See section 3, part 4: Tail pointers are common with linked lists and thus is considered a basic of linked lists), and a plurality of elements each containing a next pointer for pointing to a next element in the queue or to null when the element occupies a last position in the queue (Inherent to queues known as linked lists), the method comprising:

defining the head pointer to function as a next pointer of the last element when the queue is empty (See section 4, "CopyList() with Local References" example on page 25); and

defining an add to end function for adding the new element to the queue, wherein the add to end function includes setting the next pointer of the new element to null; as an atomic transaction, setting the tail pointer to point the new element, while saving a location of the last element; and setting the next pointer of the last element to point to the address of the new element by using the last element's saved location (See section 3, part 4: This action is also inherent to queues and the actions are indicative of an enqueue to an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan with Parlante. Hagan already discloses the use of other queues (See column 3, lines 29-32). Parlante teaches the use of a linked list with head and tail pointers. Modifying the queue of Hagan wherein the queue has a head pointer, a tail, and a plurality of

elements each having a next pointer would be a stylistic preference and is within the scope of the invention by Hagan.

As per claim 12, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising an empty function for removing each element from the queue, the empty function including waiting until the head pointer is not null or until the queue is empty, and if the queue is not empty: saving a value of the head pointer; setting the head pointer to null; as an atomic transaction, pointing the tail pointer to the head pointer while saving a value of the tail pointer; and using the saved values of the head pointer and tail pointer, traversing the dequeued elements and waiting for the next pointer of each element not addressed by the saved value of the tail pointer to become non-null (This sort of action describes the action of a deconstructor, which, if not inherent, is obvious to a person have ordinary skill in the art at the time the invention was made).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 13, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising a remove from front function, wherein a front-most element is removed from the queue, the remove from front function including waiting until the head pointer is not null or until the queue is empty and if the queue is not empty; if the front-most element's next pointer is not null, setting the head pointer to an address of the front-most element's next pointer (Inherently done with a dequeue so rest of queue is not lost); if the front-most element's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the front-most element, pointing the tail pointer to the head pointer (Inherently done with a dequeue with an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 14, Hagan discloses further comprising if the atomic compare and exchange failed, waiting for the next pointer of the front-most element to

become non-null, and pointing the head pointer to the element pointed to by the next pointer of the front-most element (See column 5, lines 55-57).

As per claim 15, Hagan discloses a system for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue), the system comprising: a first processor (See column 2, lines 28-30: There are more than one processor); a plurality of instructions for execution on at least the first processor (See column 2, lines 50-54: Instructions are also inherent to processors), the instructions including instructions for: defining a locked state for the queue (See column 4, lines 47-54: Interrupts are used to lock the queue).

Hagan does not explicitly teach the use of a linked list with head and tail pointers. Hagan does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante does teach wherein the queue has a head pointer to point to a first element of the queue or to null if the queue is empty (A head pointer is inherent with linked lists), a tail pointer to point to a last element of the queue or to the head pointer if the queue is empty (See section 3, part 4: Tail pointers are common with linked lists and thus is considered a basic of linked lists), and a plurality of elements each having a next pointer for pointing to a next element in the queue or to null when the element occupies a last position in the queue (Linked lists inherently have the next link), the system comprising: defining the head pointer to function as a next pointer of the last element when the queue is empty (See section 4, "CopyList() with Local References" example on page 25);

and defining an add at end function for adding a new element to the queue even when the queue is in a locked state, the add at end function including setting the next pointer of the new element to null; as an atomic transaction, setting the tail pointer to point the new element, while saving a location of the last element; and setting the next pointer of the last element to point to the address of the new element by using the last element's saved location (See section 3, part 4: This action is also inherent to queues and the actions are indicative of an enqueue to an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan with Parlante. Hagan already discloses the use of other queues (See column 3, lines 29-32). Parlante teaches the use of a linked list with head and tail pointers. Modifying the queue of Hagan wherein the queue has a head pointer, a tail, and a plurality of elements each having a next pointer would be a stylistic preference and is within the scope of the invention by Hagan.

As per claim 16, Hagan discloses further comprising: a second processor (See column 2, lines 28-30: There are more than one processor); and instructions for defining a locked state to allow only the first processor to remove elements from the queue (See column 4, lines 47-54: Interrupts are used to lock the queue).

As per claim 17, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for an empty function, wherein each element is removed from the queue, the instructions comprising: waiting until the head pointer is not null, or until the queue is empty; and if the queue is not empty: saving a value of the head pointer; setting the head pointer to null; as an atomic transaction, pointing the tail pointer to the head pointer while saving a value of the tail pointer; and using the saved values of the head pointer and tail pointer, traversing the dequeued elements and waiting for the next pointer of each element not addressed by the saved value of the tail pointer to become non null (This sort of action describes the action of a deconstructor, which, if not inherent, is obvious to a person have ordinary skill in the art at the time the invention was made).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 18, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for a remove from front function, wherein a front-most element is removed from the queue, the instructions comprising waiting until the head pointer is not null or until the queue is empty, and if the queue is not empty; if the front-most element's next pointer is not null, setting the head pointer to the address in the front-most element's next pointer (Inherently done with a dequeue so rest of queue is not lost); if the front-most element's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the front-most element, pointing the tail pointer to the head pointer (Inherently done with a dequeue with an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 19, Hagan discloses further comprising instructions for, if the atomic compare and exchange failed, waiting for the next pointer of the front-most element to become non-null and pointing the head pointer to the element pointed to by the next pointer of the front-most element (See column 5, lines 55-57).

As per claim 20, Hagan discloses further comprising instructions for defining that the queue is unlocked when the head pointer is not null, or when the head pointer is null and the tail pointer points to the head pointer (By the contrapositive of the definition in claim 1, this must be true)

As per claim 21, Hagan teaches wherein the instructions for defining a locked state for the queue comprise instructions that the queue is locked when the head pointer is null and the tail pointer does not point to the head pointer (This can a normal occurrence with a linked list system, depending on the algorithm used, in which an element is in the process of being added to an empty queue. This in-between step will now be interpreted as being in locked state); and instructions for defining a locking function for the queue (See column 4, lines 47-54: Interrupts are used to lock the queue), the instructions comprising: if the previous value of the head pointer is null and the queue is not empty repeating the locking function (See column 5, lines 55-57).

Hagan is silent on many other aspects of the queue but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches if the queue is not empty and not locked, as an atomic transaction, setting the head pointer to null and retaining a previous value of the head pointer (See section 3, part 3).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of

Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 22, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for an add to front function, wherein the new element is added to a front position of the queue, the instructions comprising:

if the queue is empty, adding the new element to a last position of the queue (This action is inherent to queues and the actions are indicative of an enqueue to an empty queue); and if the queue is not empty: locking the queue; saving a previous value of the head pointer; setting the next pointer of the new element to the previous value of the head pointer; and pointing the head pointer to the new element, thereby unlocking the queue (This action is inherent to queues).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 23, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for an empty function, wherein each element is removed from the queue, the instructions comprising: locking the queue; and if the queue is not empty: as an atomic transaction, pointing the tail pointer to the head pointer while saving a value of the head and tail pointers, thereby implicitly unlocking the queue; and by using the saved values of the head pointer and tail pointer, traversing the dequeued elements and waiting for the next pointer of each element not addressed by the saved value of the tail pointer to become non null (This sort of action describes the action of a deconstructor, which, if not inherent, is obvious to a person have ordinary skill in the art at the time the invention was made).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 24, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for a remove from front function, wherein a front-most element is removed from the queue, instructions comprising: locking the queue (Inherently done to avoid conflicts in a multi-processor system); if the queue is not empty and the front-most element's next pointer is not null, setting the head pointer to an address in the front-most element's next pointer (Inherently done with a dequeue so rest of queue is not lost); and if the queue is not empty and the front-most element's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the front-most element, pointing the tail pointer to the head pointer, thereby implicitly unlocking the queue (Inherently done with a dequeue with en empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 25, Hagan discloses further comprising instructions for, if the atomic compare and exchange was performed and failed, waiting for the next pointer of the front-most element to become non-null and pointing the head pointer to the element pointed to by the next pointer of the front-most element, thereby implicitly unlocking the queue (See column 5, lines 55-57).

As per claim 26, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for a remove specific function, wherein a target element is removed from the queue, the instructions comprising: locking the queue (Inherently done to avoid conflicts in a multi-processor system); determining if the queue is not empty; and if the queue is not empty: traversing the queue to locate the target element (Inherent as the only known elements are the first and last elements); and if the target element's next pointer is not null and the target element is not addressed by the previous value of the head pointer, setting the next pointer of an element previous to the target element to point to an element pointed to by the target element's next pointer (Inherently done with a dequeue so rest of queue is not lost), and return the head pointer to the previous value, thereby implicitly unlocking the queue (Inherently done with a dequeue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 27, Hagan teaches a method for implementing a global queue (See column 4, lines 1-4: A shared queue is the same as a global queue).

Hagan is silent on a linked list but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches further comprising instructions for: if the target's next pointer is not null and the target is net addressed by the previous value of the head pointer, setting the head pointer to point to the element pointed to by the target's next pointer, thereby implicitly unlocking the queue (Inherently done with a dequeue to return from its locked state); if the target's next pointer is null and the target is not addressed by the previous value of the head pointer, setting the next pointer of the element prior to the target to null (Inherent done with a dequeue in which it element is to be removed); and if the target's next pointer is null, as an atomic compare and exchange, if the tail pointer points to the target set the tail pointer to point to the element previous to the target (This is inherently done after a dequeue), or to point to the head pointer if the target is addressed by the previous value of the head pointer (This is inherent with an empty queue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

As per claim 28, Hagan discloses further comprising instructions for:

if the atomic compare and exchange was performed and failed: waiting until the target's next pointer is not null (See column 5, lines 55-57). Hagan is silent on many other aspects of the queue but does teach where any type of standard queue/linked list can be used with his invention (See column 3, lines 29-32).

Parlante teaches if an element addressed by the target's next pointer is an only remaining element in the queue, setting the head pointer to point to the only remaining element, thereby implicitly unlocking the queue (Inherently done after a dequeue); if the element addressed by the target's next pointer is not the only remaining element in the queue, setting the next pointer of the element previous to the target to the address in the next pointer of the target and setting the head pointer to the previous value of the head pointer, thereby implicitly unlocking the queue (This is inherently done with a dequeue); and if the atomic compare and exchanged was performed and succeeded: if the queue is not empty setting the head pointer to the previous value of the head pointer, thereby implicitly unlocking the queue (This is inherently done with a normal dequeue).

It would have been obvious to a person have ordinary skill in the art at the time the invention was made to have modified Hagan to include the teachings of Parlante because although Hagan does not teach a linked list with a head and tail pointer, it is within the scope of the invention to include the teachings of Parlante.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to show further art related to method and system for management of global queues utilizing a locked state:

U.S. Patent # 5,546,391 to Hochschild et al shows a central shared queue based time multiplexed packet switch with deadlock avoidance.

U.S. Patent # 6,179,489 B1 to So et al shows a device, methods, systems, and software products for coordination of computer main microprocessor and second microprocessor coupled thereto.

U.S Patent # 6,480,918 B1 to McKenney et al shows lingering locks with fairness control for multi-node computer systems.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent Lai whose telephone number is (571) 272-6749. The examiner can normally be reached on M-F 8:00-5:30 (First BiWeek Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fritz M. Fleming can be reached on (571) 272-4145. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vincent Lai
Examiner
Art Unit 2181

vl
June 8, 2006

Supervisory

FRITZ FLEMING
PRIMARY EXAMINER
GROUP 2100

6/12/2006

AU 2181